

BACKYARD DRILLING: LOCAL GOVERNMENT RESPONSES TO NATURAL GAS DRILLING IN THE BARNETT SHALE OF NORTH CENTRAL TEXAS

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For many years, natural gas drilling was a land use issue that most significantly impacted the rural areas of Texas and the nation; however, with the advent of natural gas drilling in the Barnett Shale in North Central Texas¹ and other parts of the United States, natural gas wells and associated production facilities have steadily encroached upon both urban and suburban areas, often leading to highly vocal demands by residents that local governments protect them from the sometimes hazardous effects of natural gas drilling. Indeed, in the last several years there have been serious concerns raised by North Central Texas residents that natural gas drilling is hazardous, with benzene, carbon disulfide and other hydrocarbons being poured into the air, cancer clusters in residential subdivisions located nearby natural gas well pad sites, truck traffic coursing city streets while carrying toxic chemicals, and unhealthy air quality resulting from such drilling. These public health concerns have been compounded by fears that the state and local governments in the shale areas in North Central Texas and the nation are doing little or nothing to address these issues, often citing constrained government budgets and a lack of manpower to monitor hundreds or thousands of natural gas well sites. As a consequence, regulatory authority often has fallen upon cities and counties, which often lack any relevant experience in addressing the complexities of natural gas production activities. The purpose of this chapter is to address the practical responses of local governments when confronted with demands that those governments “do something” to protect residential areas from the perceived ill effects of natural gas drilling, while offering practical observations whether a municipality should view the siting of gas wells as either a zoning issue or a land use matter not directly associated with traditional zoning concepts. The last portion of this chapter addresses specific issues that cities and other local governments should evaluate and address when contemplating the adoption of a natural gas drilling ordinance or other regulatory scheme.

The experience of many municipalities in North Central Texas with the advent of the Barnett Shale drilling boom was both difficult and problematic—most municipal land use regulations in the area simply failed to address in any meaningful way how and by what processes a municipality should consider an application or other authorization to drill for natural gas. Indeed, since the Dallas/Fort Worth Metroplex

¹ The Barnett Shale is a natural gas formation that is approximately 5,000 square miles in size located in North Central Texas and underlies much of the Dallas/Fort Worth Metroplex.

had almost no recent or significant history of oil drilling activities in the area, most North Central Texas cities had no regulations on the books that addressed (or even could be inferred to address) natural gas drilling. The closest most cities came to confronting the issue was a zoning restriction that mineral extraction or similar mining activities (such as a gravel quarry) required some type of specific/special/conditional use permit, with almost no criteria providing any substantive guidance about the factors be utilized in considering the approval or denial of a permit for such mineral extraction or mining activities. As a result, most cities in North Central Texas were at a loss about how to address natural gas drilling—suddenly, they were confronted with the issue, and at first, many cities floundered. Now, more than a decade later, the cities in the Barnett Shale in North Central Texas have some experience in dealing with gas drilling inside a city’s corporate limits.

I. Moratorium or No Moratorium?

The first issue a municipality may be asked to consider prior to the adoption of a comprehensive natural gas drilling ordinance is whether the adoption of a temporary moratorium is both legal and practical while the municipality is considering such natural gas drilling regulations. In general, a moratorium is a legally authorized period for the delay or abeyance of some activity. While moratoriums traditionally have been adopted when cities are considering amendments to zoning or subdivision ordinances, the adoption of a natural gas drilling moratorium has been used frequently by cities in Texas to temporarily cease natural gas drilling activities (or the filing of applications or permits to start natural gas drilling activities) until new or updated gas drilling regulations are considered and approved by the city. Such moratoriums or similar interim land use controls play an important role in protecting the city’s natural gas drilling review process by limiting the ability of gas producers to acquire vested rights or other production rights that may conflict with the city’s review process. Simply stated, a short-term moratorium on natural gas drilling while a city considers how to address such drilling in an ordinance is a tried and true way to make sure that gas drillers do not get ahead of the city by filing and receiving drilling permits prior to the city adopting an ordinance on the subject of gas drilling.

It is clear that there may be very serious vested rights problems that may arise if there is no temporary cessation by a municipality of either the acceptance of applications for permits to drill or actual drilling activities during the period when a municipality is considering new or stronger natural gas drilling regulations. The vested rights issue is one that any city must seriously consider, in consultation with its attorney. A “vested right” in everyday language means that some type of legal right has been received because an application was made under the law in effect at the time of the application. For example, if an application is made for a gas drilling permit on January 1, then that application is governed by the municipal ordinances in effect on January 1—the fact that the city adopts new gas drilling regulations on February 1 is not relevant—the applicant “vests,” or receives the benefits of, the regulations in place as of the January 1 date of application.

While the determination whether a gas drilling moratorium is authorized by law should be determined on a state-by-state basis, it is clear that the failure to adopt a moratorium may result in a flood of applications for drilling permits that are “under the wire,” that is, are subject to the prior, often less stringent (or non-existent) regulations in effect prior to consideration of new regulations. Consequently, a moratorium should be considered by a city during the time period when a city is considering the initial adoption of regulations for natural gas drilling or amending its existing natural gas drilling regulations to strengthen or otherwise update them.

II. Is Local Regulation of Natural Gas Drilling a Traditional Zoning Matter or an Administrative Approval Issue?

When considering the adoption of an ordinance to regulate natural gas drilling (and particularly variances from the terms of such an ordinance), a city council or other governmental body inevitably questions whether it should (i) consider natural gas drilling activities to be a traditional zoning issue (that is, either rezone property for such a use, or consider a specific/special/conditional use permit² to allow such a use in all or certain specific zoning districts), or (ii) utilize a board or commission, such as the city’s existing zoning board of adjustment, as an oil and gas board of appeals to consider such variances. I believe that traditional zoning review by a city’s planning and zoning commission, and thereafter review by the city council, of natural gas drilling permit applications and setback variance requests, utilizing traditional zoning procedures as the mechanism by which to review such permits and variance requests, is not desirable. Indeed, as detailed below, it is strongly recommended that this approach not be utilized because (i) it in all likelihood may lead to litigation against the city for unconstitutional takings of property; (ii) the cities in North Central Texas that utilize traditional zoning procedures to review permit applications for natural gas wells and setback variance requests have uniformly approved all

² A specific use permit (also called a special use permit or conditional use permit in many city zoning ordinances) allows a landowner to use his property in such a manner that is not authorized by the city’s base zoning ordinance. Most cities that have adopted zoning ordinances separate the city into different zoning districts and, in each zoning district, certain uses of property are permitted as a matter of right. Zoning ordinances generally have a “special uses” (or “specific uses” or “conditional uses”) section in the city’s zoning ordinance that allow for uses that are just outside the intended uses for that zone. For example, an industrial zone may not by right authorize an industrial plant to have a helicopter landing pad at the plant site because often high-voltage electrical lines may be located near the industrial plant; however, if there are no such electrical lines in the vicinity, the city council may grant a specific use permit to allow a helicopter landing pad at the industrial plant site. Even though every industrial plant site in the city may not be safe for a helicopter landing pad, that specific industrial plant is safe for such a landing pad, and is allowed under a permit for that plant site.

applications and setback variances³ and consequently, the use of traditional zoning procedures is untested and of little or no value when considering a city's legal options and potential liability; and (iii) if traditional zoning procedures are adopted, a city council may be required to approve any setback variance request by a super-majority vote in those cases where the city's planning and zoning commission denied a variance, thus requiring the city council to choose between siding with local residents who invariably will oppose the setback variance, or unconstitutionally denying a subsurface landowner his/her rights to mine or otherwise exploit the mineral estate.

Several municipalities in North Central Texas utilize traditional zoning procedures when considering natural gas well drilling applications and well setback variances. By "traditional zoning procedures," I mean that applicants apply for a rezoning of property or for a specific use permit (also called special use or conditional use permits) to allow for the extraction of minerals from the subsurface (often called the mineral) estate. Thus, any drilling application or well setback variance request would be subject to notice provisions similar to standard zoning cases (200-foot rule notification and newspaper notice), with a public hearing before the city's planning and zoning commission followed by a public hearing before the city council. Further, as in all zoning cases, any drilling application or variance request denied by the planning and zoning commission would require a super-majority vote (75%) by the city council to be approved.⁴

While municipalities that utilize the traditional zoning model appear to be fairly evenly split whether a well site requires a zoning classification change or simply a

³ Several cities in the Barnett Shale have adopted extensive natural gas drilling and production ordinances; however, many of the ordinances of those same cities provide that any provision in the ordinance may be subject to a variance approved by the city council. Consequently, the city council in many cases is confronted with a drilling permit application with multiple variances requests, from a reduction of insurance requirements, to hours and days of permitted drilling operations, to setback distance variances and allowing gas drilling and operations in or near public parks or in the floodplain. To the author's knowledge, and as noted in the text, because literally all gas drilling permits have been approved in such situations, the "let's make a deal" approach to the consideration of variances has not been tested in the courts.

⁴ See Tex. Local Gov't Code § 211.006(d) and (f). A proposed zoning change that is protested by at least twenty percent (20%) of (i) the area of lots or land covered by the proposed change or (ii) the area of the lots or land immediately adjoining the area covered by the proposed change and extending 200 feet from that area requires a three-fourths (super majority) of the city council to approve the zoning change, or if the city has adopted an appropriate ordinance, a decision to deny the proposed zoning change by the city's planning and zoning commission requires a similar three-fourths vote of the city council to approve the zoning change, respectively.

specific use permit, in none of those cities has that process been challenged since every (or almost every) application for a gas well ultimately has been approved.

The second approach is administrative approval of a gas drilling permit application by a municipal official (usually the city's oil and natural gas inspector or other similar administrative official), with review by a board of adjustment (sometimes called an oil and gas board of appeals) for consideration of any distance setback variances to the provisions of the city's natural gas drilling ordinance. This approach results in the administrative approval of a natural gas drilling permit, assuming that all criteria outlined in the natural gas drilling ordinance are met by the drilling permit applicant. If all criteria indeed are met, there is no planning and zoning commission or city council review of the application to drill; however, in the event a distance setback variance of some sort is required,⁵ then a board of adjustment or board of appeals reviews the requested variance and, applying specific, setback-related criteria detailed in the natural gas drilling ordinance, determines whether the variance is merited. If so, the gas drilling permit is approved subject to the variance. If the variance is not approved by the board, then an applicant may resort to judicial review, not unlike that type of judicial review afforded an applicant when a zoning board of adjustment has denied a requested zoning variance.⁶

I believe the administrative approval model is the preferable approach. First, an appeal board takes the city council out of the "crosshairs" of the community. In almost every city where natural gas drilling is an issue, there are strong feelings in the community whether gas drilling should even be allowed. Requiring the city council to consider each and every permit or variance request places the city council in an untenable political position. There often are intense lobbying efforts by citizens to approve or reject gas well drilling sites and more often than not, as gas drilling creeps closer to urban areas, the political pressure on most city councils is to deny all gas well drilling permits, in effect outlawing natural gas drilling in the municipality.

⁵ As a practical matter, in cities that have adopted the administrative approval model, relatively few provisions contained in a natural gas drilling ordinance are subject to variances other than setback distances (that is, the distance from the wellhead or pad site exterior to another nearby structure or use). In the administrative approval model, it is my experience that overwhelmingly the variances considered by a board of adjustment or board of appeals relate to distance setbacks. In many natural gas drilling ordinances, distance setbacks are mandated from existing residences, schools, hospitals, religious institutions, public parks, floodplain, other buildings designed for human occupancy, property lines, water wells and environmentally sensitive areas in the city.

⁶ See, e.g., Tex. Local Gov't Code § 211.011. See also Town of Flower Mound, Texas, Code of Ordinances, § 34-432 (addressing appeal of determination of oil and gas inspector to oil and gas board of appeals and judicial review of decision of board determination relative to variances).

Second, the issues and factors to be considered by a board of appeals are significantly different than the issues and factors a city council utilizes in traditional zoning/land use cases. The inherent tension between surface and mineral rights is rarely, if ever, an issue in a traditional zoning case, which addresses the concept of separating incompatible land uses through the establishment of fixed rules. Third, traditional zoning techniques authorize uses of property in certain zoning districts while not permitting those same uses in other zoning districts. If that model is utilized in a gas drilling context, there could be serious concerns about an unconstitutional taking of property as a consequence; that is, “zoning” by definition separates certain uses of property from other uses a property—for example, a single family residence is rarely located next to a large industrial facility. If every gas drilling permit is considered through the lens of zoning, and a permit may be granted on a well-by-well basis, then get ready for every permit being approved. Fourth, if small tracts of land are rezoned for natural gas drilling, then there may be a violation of state law, which requires that all zoning must be in accordance with a comprehensive plan.⁷ Comprehensive plans traditionally do not contain provisions for natural gas drilling and as a consequence, if a small tract of land is rezoned for natural gas drilling, there may arise an issue of illegal spot zoning. Fifth, in those municipalities that utilize specific/special/conditional use permits to allow gas drilling on a specific tract of land, there usually is either unbridled discretion or very vague standards by which the city council may judge the drilling permit. Clearly, such unbridled discretion or vagueness may result in state or federal unconstitutional takings challenges, due process challenges or similar constitutional or legal challenges.

The inherent advantages of board consideration distinct from a city council's traditional zoning consideration include the following. First, the board looks at well siting issues unrelated to zoning districts and zoning classifications. This approach may be utilized to address adjacent uses of property (regardless of underlying zoning/land use districts or classifications) and land features, such as water wells, habitat, floodplain, existing nearby structures, property/tract lines, nearby parks and roadways. Second, an appeals board, much like a zoning board of adjustment, is a quasi-judicial body (not a legislative body) and as such, is afforded more inclusive quasi-judicial immunity in litigation rather than less broad legislative immunity. Third, the board of appeals, after considering variances and other gas-related issues over time, often develops an expertise and understanding of such issues, and may not be subject to political whims, particularly since members often may only be removed for cause. Last, appeals from the decision of a board of appeals proceed directly to court via a writ of certiorari process which, in the long run, is more expeditious and less costly. Moreover, if there is a serious unconstitutional takings issue at play, the city will have the opportunity to consider settlement without having had incurred significant attorney's fees. It is my belief that where the administrative approach has been utilized in North Central Texas, it appears that it has been very successful and the

⁷ See Tex. Local Gov't Code § 211.004.

appeal boards have been diligent in making findings and accommodating both residents and the legal interests of natural gas drilling applicants.

III. Controversial Issues in the Regulation of Municipal Gas Drilling

While many North Central Texas municipal gas drilling ordinances usually contain detailed provisions about insurance coverage, application fees, emergency notification procedures, landscape screening and buffering requirements, on-site signage and fencing, among other technical requirements, several issues are far more controversial and vary greatly from city-to-city. Key natural gas drilling ordinance provisions that should be analyzed in great detail follow.

Natural Gas Well Distance Setbacks. Without a doubt, distance setbacks are the most controversial aspect of natural gas drilling in urban and suburban areas. In the Barnett Shale, early municipal gas drilling ordinances generally contained setbacks in the 300-600 foot range. For example, several cities adopted 600 foot setbacks from a wellhead to a residence or other habitable structure, with distance setback variances down to 300 or 400 feet. With greater public concern about the potential health effects of natural gas drilling, many municipal ordinances across the region underwent substantial revisions during the last several years, for example with distance setback measurements being made not from the wellhead but from the edge of the pad site, and not from the pad site edge to a residence or other habitable structure, but to the property line of the residence or habitable structure. Moreover, in many instances, distance setbacks simply were increased. In one North Central Texas city, the setback from the edge of a pad site to a habitable structure was increased to 1,500 feet, with a variance only down to twenty-five percent (25%) of the setback distance (or 1,125 feet).⁸ Public concern about setbacks often has been critical, with allegations that setbacks are either too close (resulting in concerns about the public health aspects of nearby natural gas drilling) or too far (resulting in concerns about such setbacks depriving mineral estate owners of the ability to realize their investments in their property). Besides unconstitutional takings concerns, scientific studies about the effects of natural gas drilling—studies related to air quality concerns, toxins, groundwater and surface water pollution, among others—enter into the picture and often are the subject of intense public debate. The general trend in the Barnett Shale has been to increase setbacks rather than reduce setbacks; nonetheless, no single issue is more controversial.

Another key issue associated with setbacks is the legally permitted variance distance. The experience of at least one Barnett Shale municipality is that whatever the designated well setback distance may be, the overwhelming majority of gas drilling applications request distance setback (and occasionally other) variances. In Flower Mound, Texas, for example, the historical data is as follows:

⁸ Flower Mound, Texas, Code of Ordinances § 34-422(d).

Total Number of Pad Sites Applied for:	22
Total Number of Pad Sites Approved:	19
Pad Sites Requiring Variances:	15 ⁹

Thus, almost 80% of the pad sites approved in Flower Mound, Texas, since the inception of its gas drilling ordinance in 2003 obtained some sort of variance, the overwhelming majority of which were distance setback variances. Therefore, based upon observations of many Metroplex cities, it is reasonable to anticipate that practically every application to drill for natural gas will contain a distance setback variance request. As the foregoing reflects, the minimum permitted setback variance that is allowed by ordinance in all likelihood will become the standard for operators, thereby ensuring that almost every operator will request a distance setback variance down to (or close to) the minimum distance allowed.

Last, the impact of natural gas drilling on residential property values should also be considered in determining appropriate distance setbacks. Although the data on this issue is scant, several studies in the Barnett Shale have reached opposite conclusions about the residential property value impact, if any, as a result of proximity of residential structures to natural gas well sites. It should be noted, however, that there may be a correlation between natural gas drilling and the impact on nearby residential property values. Additionally, as residential sales data becomes more mature, the effect of natural gas drilling operations on residential property values may become more reliable. Thus, if through the setback variance process gas drilling is permitted closer to residential properties, it appears that there may be greater potential for the reduction of nearby residential property values. A reduction of nearby or neighboring property values clearly is emotionally charged.

Drilling in Floodplains. Cities grapple with the issue whether any natural gas drilling should be permitted in the floodplain. While floodplain may be either FEMA floodplain or floodplain as defined in city ordinances, the issue is controversial for a simple reason—floodplains are subject to flooding, and any gas drilling- or production-related equipment (particularly tanks containing undisclosed, toxic hydraulic fracturing chemicals, produced water or condensate) that is inundated by floodwaters may create significant health and safety risks, threatening water quality and aquatic life. Numerous cities in the Barnett Shale consequently have prohibited gas drilling and operations in any floodplain areas.

Those individuals either residing or owning property downstream of gas drilling facilities located in the floodplain may face serious environmental and other physical damages in the event of a flood inundating gas wells and related equipment. Additionally, due to exemptions from several federal laws relative to the disclosure of hydraulic fracturing chemicals, gas drilling operations in the floodplain are different

⁹ Information provided by the Town of Flower Mound, Texas, Environmental Services Division.

from other uses of property that may be permitted in floodplain areas. It is my opinion that due to the legal status that allows operators to not disclose the chemicals used in hydraulic fracturing, comparing natural gas drilling to other land uses that are not accorded such legal status is neither appropriate nor justifies location of gas drilling operations in the flood plain.

Drilling in Public Parks. Another controversial issue is whether cities should allow natural gas drilling in public parks. The reasons why this is a matter of intense public debate should not be surprising. First, public parkland is a valuable commodity, regardless how the parkland currently is used or where it is located in a city. The use of parkland for natural gas drilling removes that land from the city's inventory of parkland, thereby permitting an industrial use of park property. Additionally, the cost of acquiring future parkland can be prohibitively expensive and time-consuming, especially if eminent domain (condemnation) procedures are utilized, and to willingly permit such parkland to be utilized for gas drilling purposes may be seen by many residents as short-sighted.

Although there exists park property in many cities that may not resemble traditional park uses, the land's designation as a park is for a purpose—the enjoyment of the park by the public. Passive parks are just as important as traditional parks and public playgrounds. Consequently, the removal of passive park areas results in the loss of public parkland. Passive park areas may become active park areas in the future; however, once a site has gas drilling activities and operations on it, that area effectively is lost as a public park area for years, if not decades. The traditional purpose of public parks, in part, is to allow citizens to escape urban activities and to enjoy open space and nature. Regardless of the designation of park property as either active or passive uses, natural gas drilling activities and operations remove that area (and the area immediately surrounding the location of such gas drilling) from any effective use as a park. It should be noted as well that as a general principle, industrial uses are not permitted in the parks of most cities.

Subsequent Property Development. When many cities consider the adoption of regulatory standards for gas drilling and production activities, the distance setback issue is usually framed in terms of “how close can a gas well be to some type of land use—a residence, a school, a park or a hospital?” An issue that often is overlooked is the converse: what happens when a gas well is permitted by a city, and after the gas well is in production, a landowner or developer opts to seek permission to build a residential subdivision, an apartment complex or retail center in close proximity to the existing gas well? If there are concerns, for example, that natural gas wells and production equipment have an adverse impact on the public health, is that not still the case if an apartment complex is built within the setback area? Should the apartment owner or developer be required to seek a variance to do so? Which entity would approve the setback variance since the issue is mixed, with concerns about “traditional” natural gas well distance setbacks such as public health issues and property values combined with concerns about the right of property owners and

developers to recoup their investments in land nearby an existing natural gas well or pad site?

The issue of subsequent property development is a significant one. Most municipal ordinances are silent on the issue, and it is the author's opinion that critical unconstitutional takings issues may be at play. For example, several municipal gas drilling task forces that have considered the issue in North Central Texas have opted to treat this topic of subsequent land development differently than the situation where a natural gas well is sited in an existing developed area. In fact, some members of gas drilling task forces have viewed subsequent developers as "coming to the nuisance," with the implication that an apartment builder (not the future apartment residents), for example, "knows what he or she is getting into," and there should be no municipal interference in such subsequent property development, even if located within the natural gas well setback area. In areas where natural gas drilling and production activities have been undertaken for years, such as in the Barnett Shale in North Central Texas, this issue of subsequent property development will be confronted more frequently since the natural gas "boom" in the area may be past, lease and natural gas prices have fallen significantly in the last several years and demand for property development has increased after the recent recession. Any municipal government addressing natural gas drilling and production would be well advised to consider this topic on the front end of gas drilling activities rather than after natural gas wells have been drilled around the city.

Saltwater Disposal Wells. An issue separate from, but clearly associated with, natural gas drilling activities is whether a municipality should allow the location of any saltwater disposal wells inside its corporate limits. Since natural gas reservoirs are found in porous subsurface rocks, saltwater, also contained in those porous rocks, accompanies natural gas to the surface. Often this saltwater is disposed of by injecting the saltwater into underground porous rock formations not productive of natural gas. When hydraulic fracturing operations occur, small quantities of substances used in the drilling, completion and production operations of a natural gas well may be mixed in the saltwater waste stream and such substances include drilling mud, hydraulic fracturing fluids and well treatment fluids. It also is not unusual to find various amounts of residual hydrocarbons in the saltwater waste.

The impact of saltwater disposal wells inside a city is indeed controversial. Often these disposal wells are regulated by state agencies, not local governments, and more troubling is seismic activity that may be associated with such disposal wells. A 2010 study of seismic activity near Dallas/Fort Worth International Airport (DFW Airport) by researchers from Southern Methodist University and The University of Texas at Austin concluded that the operation of a saltwater injection disposal well in the area was a "plausible cause" for the series of small earthquakes that occurred in the area between October 30, 2008, and May 16, 2009. The study noted that the earthquakes in the area of DFW Airport did not appear to be directly connected to natural gas drilling, hydraulic fracturing or natural gas production; however, the injection of waste fluids at a nearby saltwater disposal well began in September 2008,

approximately seven weeks before the first DFW earthquakes occurred—and none were recorded in the area after the saltwater injection well ceased operation in August 2009. A state tectonic map prepared by the Texas Bureau of Economic Geology reflected a northeast-trending fault intersected at the location where the DFW Airport quakes occurred. The SMU study concluded that it was “plausible that the fluid injection in the southwest saltwater disposal well could have affected the in-situ tectonic stress regime on the fault, reactivating it and generating the DFW earthquakes.”¹⁰

It is not unusual for municipalities in the Barnett Shale to prohibit saltwater injection wells. Disposal wells are considered an industrial use of property separate from natural gas drilling operations, generating large amounts of truck traffic and noise similar to other industrial activities. Additionally, even when nearby natural gas drilling activities have concluded, disposal wells continue in operation and generally accept saltwater waste from any source, including natural gas wells far away. Consequently, saltwater disposal wells are independent businesses that remain in operation for years or decades. Even when efforts are made to limit saltwater disposal well operators from accepting waste from outside a city, such efforts are legally problematic since few industries are limited to such a small area of operation, and it is not unreasonable to expect that pressure will mount to “open up” the disposal well to accept saltwater waste from other well sites outside the city due to disposal well operator concerns about financial viability after in-city natural gas operations have ceased or natural gas wells have experienced limited production and are near depletion.

Regulation of Water Sources Necessary for Natural Gas Drilling. Another area of concern is the vast amount of water used in natural gas drilling, including the use of millions of gallons of water in hydraulic fracturing operations. What is the source of the water used in drilling and fracturing—the nearby municipal water system, surface waters, water wells or other sources? Some cities have mandated that municipal water be used, often resulting in a financial windfall for those cities. Other cities have desired to limit the source of water to non-municipal water suppliers, which may result in truckloads of water being transported along city streets and concomitant damage to roadway infrastructure. Coupled with concerns associated with water sources is the issue of water restrictions in periods of drought—is it legally permissible for a city, for example, to limit the water supply to a drill site while other large industrial users of water are not similarly limited? These issues should be evaluated in great detail by a city council or other governmental body prior to the adoption of any natural gas drilling ordinances or regulations.

¹⁰ Southern Methodist University. “Texas earthquakes: Operation of saltwater injection disposal well in area was a ‘plausible cause.’” *ScienceDaily*, 10 Mar. 2010. Web. 8 Nov. 2012.

IV. Conclusion

With technological improvements in natural gas drilling, operations and production resulting in more gas drilling activities in Texas and throughout the nation, particularly in more heavily-populated areas, local government regulation of natural gas production has become both an important and highly controversial issue for citizens, neighborhoods, natural gas operators, city planning departments, local government attorneys and developers. When a government first faces the issue whether a natural gas drilling ordinance is either needed or desired, the experience of other local governments that have dealt with this matter should be evaluated. Those experiences no doubt will provide the government with the opportunity to craft an ordinance or other regulatory scheme based upon the trials and errors of those other cities. Regardless of the decisions made by a local government how and in what manner to address the topic of natural gas drilling, the intensity of the political pressures and public interest in urban and suburban natural gas drilling and production cannot be overstated.